

PROCEEDINGS

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DISCUSSION OF
PROCEEDINGS PAPERS

505, 632

CONSTRUCTION DIVISION

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Discussion of
"IMPROVING THE LOAD CARRYING CAPACITIES OF SUBGRADES"

By Charles M. Noble
(Proc. Paper 505)

CHARLES M. NOBLE,¹ M. ASCE.—Since the paper was written (1952) several manufacturers produce heavy rollers with 25,000 lb. wheel loads mounting pneumatic high pressure tires. The Specifications for widening the New Jersey Turnpike require a tire pressure of 140 lb. per square inch on such rollers. This modern tool will assist in securing properly compacted subgrades composed of granular materials.

The discussion by Mr. Huang is important in emphasizing the absolute necessity of providing adequate drainage that will permanently lower the ground water table to an acceptable depth below the surface of the pavement. It is also worthy of note that granular sub-bases must extend to the ditch lines or to continuous longitudinal pipe underdrains, otherwise water will be trapped and prevented from flowing laterally out from under the pavement. This water may enter from below in cuts, and originate by penetration through the median of dual highways during wet weather.

Boxed out or trenched sections filled with granular sub-base material may become reservoirs for water unless there is positive means for the water to escape.

The relative ease of compacting granular materials to 95% density Modified AASHC raises the question whether this density is sufficient to successfully withstand, without distortion, heavy repetitious loads such as is experienced on densely travelled highway trunk routes. Recent studies indicate that granular soils should be compacted up to approximately 105% of Modified AASHO. It is hoped the forthcoming Illinois test road will throw further light on this question so that specifications can reflect requirements that will assure subgrades free from subsequent compaction under traffic.

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Discussion of
"STRUCTURAL SUCCESS OR FAILURE?"

by Jacob Feld
(Proc. Paper 632)

JACOB FELD,¹ M. ASCE.—Formal technical education teaches one what to do and to a lesser extent, how to do it but only practice teaches what not to do. No single life span is sufficient to experience all the lessons of what not to do, even in a restricted specialized field of endeavor. The purpose of the paper was to bring to the attention of the profession that one can learn, if he so desires, from the experience of others, if they will only provide the record of their experience. Such advice has been given many times in the history of the profession, but since the same combination of errors is found repeated and resulting in similar failures year after year, the writer thought that a broadly represented committee from the structures and the construction divisions could bring enough weight and prestige to the reports of failures to give the information so offered credible standing and authority. And in this manner, the lessons might become the basis of standard procedure and warnings which would reduce the number of incidents.

There is precedence for such action by a technical society and the considerable correspondence received after the paper was presented in addition to the three members who sent in the discussions all express agreement with the suggestion that such a committee be formed. After the San Diego meeting, the writer was advised that the executive committees of the structural and construction sections, acting first independently and then jointly, decided that such a committee would not be able to do effective work. Since 70 of the 75 attendees at the meeting when the paper was presented expressed agreement with a motion made from the floor that the suggestion of a committee formation be presented to the executive committees for consideration, it may well be that further expression from the membership may result in the formation of such an investigating committee.

If the Society does not take control of such investigations and reports, the other possibility is the continuous legislation of controls by non-technical elected and appointed State and municipal officials, a system which foreign engineers do not comprehend since it takes away from the engineer his claimed right and ability to be an independent professional. The editorial in the, "Engineering News-Record" of July 21, 1955, on, "More Laws to Hamper Construction" and that in the "Construction Methods" of June 1955 on "Accidents Turn Back the Clock," both sound this warning, following the actions by municipal authorities in New York as a result of the collapse of formwork supports in the New York Coliseum construction. The writer is the designing engineer of that operation and has supervision duties over the permanent work but no control over the construction methods and expedients. There is a reasonable certainty that if the lessons from earlier form support failures

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were more commonly known, this one would have been avoided. In spite of the authority of the printed word, a report in the technical press, usually before all the facts have been collected, is merely read but not remembered. In the author's opinion the authority of the suggested committee is necessary.

Many a structure must pass through a critical stage during construction before the engineer can be satisfied that it is stable and a successful performance of his design. Such critical operational shock always requires special watching in tunnel excavations, in bridge erection, underpinnings and concrete falsework. Failures resulting not from insufficiencies of the structural design of the completed work but from unexpected movements in the construction expedients are, in the public mind, not distinguished from each other. The printed reports of such incidents indicate that they usually occur near the end of a job when progress is at the maximum scheduled rate and man power is not sufficient to provide all the necessary functions to guard against failure. Even if the man power is sufficient, the work is often so concentrated that space is not available for proper performance. The forces which cause these failures are not of the same magnitude or even direction as the loads used for the structural design. And simultaneously, the strength of fresh concrete, unbraced steel or blasted rock faces and roofs is lower than the desired values as assumed by the designers.

Failures in completed structures are much less common than when steel bridges were being sold by non-technical salesman on open competition, or when less was known about concrete than the much too little now commonly known. With very few exceptions, failures in completed structures are from dishonest performance and non-compliance from ignorance rather than from improper design.

In summary, the profession knows what to do, but has not been able to teach the performance phase what not to do. The writer thanks the discussers for their trouble in adding information and agreement to the general thesis of the paper. Further collection of data and the use of it in lectures before technical organizations is planned and the material to be presented at several scheduled meetings in the next few months will, it is hoped, find their way into accessible journals so that all may learn by the experience of others.

PROCEEDINGS PAPERS

The technical papers published in the past year are identified by number below. Technical-division sponsorship is indicated by an abbreviation at the end of each Paper Number, the symbols referring to: Air Transport (AT), City Planning (CP), Construction (CO), Engineering Mechanics (EM), Highway (HW), Hydraulics (HY), Irrigation and Drainage (IR), Power (PO), Sanitary Engineering (SA), Soil Mechanics and Foundations (SM), Structural (ST), Surveying and Mapping (SU), and Waterways (WW) divisions. Papers sponsored by the Board of Direction are identified by the symbols (BD). For titles and order coupons, refer to the appropriate issue of "Civil Engineering" or write for a cumulative price list.

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MARCH: 634(PO), 635(PO), 636(PO), 637(PO), 638(PO), 639(PO), 640(PO), 641(PO)^C, 642(SA), 643(SA), 644(SA), 645(SA), 646(SA), 647(SA)^C, 648(ST), 649(ST), 650(ST), 651(ST), 652(ST), 653(ST), 654(ST)^C, 655(SA), 656(SM)^C, 657(SM)^C, 658(SM)^C.

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c. Discussion of several papers, grouped by Divisions.

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